

## Temperature Dependence of Driven Duffing Oscillators

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We investigate the temperature dependence of the stationary distribution for the Driven Duffing Oscillator (DDO). We focus on the *fragility* of the zero temperature solution. This unusual phenomenon<sup>1</sup> means that the probabilities over the two stable vibrational states will endure an abrupt change in the presence of a small temperature. In this work, we first numerically demonstrate the *fragility* of the zero temperature solution. Realizing that this is due to the violation of the detailed balance condition, we find a condition for the divergency of the small temperature perturbation theory. Then an analytical expression for a critical temperature  $T_c$  is obtained. Our results reveal that this fragility is more and more prominent as the number of states in the quasienergy potential wells increases which indicates a semiclassical regime. The fragile regime can be investigated with currently existing experimental setups.

<sup>1</sup>M. Marthaler and M. I. Dykman, Phys. Rev. A **73**, 042108 (2006).